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Phillip W. Woo
c/o Sidley, Austin, Brown & Wood LLP
555 California Street
Suite 5000
San Francisco, CA 94104-1715

EXAMINER	
ODOM, CURTIS B	
ART UNIT	**PAPER NUMBER**
2634	

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/617,592	PARK ET AL.	
	Examiner	Art Unit	
	Curtis B. Odom	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17,20,23-39,42-44 and 47-50* is/are rejected.

7)☒ Claim(s) *18,19,21,22,40,41,45 and 46* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 July 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/14/04 have been fully considered but they are not persuasive. Applicant states that the MLT encoding disclosed by Manohar et al. (U. S. Patent No. 5, 917, 340) includes multiple levels, but these levels do not constitute signal regions which are used to define at least part of a symbol. However, it is the understanding of the examiner that these level do constitute signal regions which are used to define at least part of a symbol. Referring to column 7, line 41-column 8, line 35, particularly Table I, there is a description of MLT encoding. There are three levels (mid, low, and high) defined by MLT encoding. As shown in Table 1, a sequence of bits (which can represent a symbol) corresponds to a particular signal level (region) and transition. Sequence A contains four bits, which can be represented as two symbols containing two bits. The symbol '01'of Sequence A is defined using a falling transition from the signal region "high" to the signal region "mid" (TP+). Thus, the MLT encoded bits/symbol are defined by a signal transition and a signal region as claimed in the present application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 35-38 and 42-44 are rejected under 35 U.S.C. 102(e) as being anticipated by Manohar et al. (previously cited in Office Action 3/11/04).

Regarding claim 35, Manohor et al. a receiver (Figs. 5 and 7) comprising:

a pre-amplifier (Fig. 5, column 5, line 66-column 6, line 63) operable to receive a symbol stream and generate a differential output, wherein the symbol stream comprises and plurality of symbols with each symbol uniquely defined by a signal transition and a signal region in a carrier signal, each symbol representing a plurality of data (column 2, lines 36-62, see also Response to Arguments above);

at least one region detector (Fig. 7, block 70, column 7, line 62-column 8, line 51) coupled to the pre-amplifier and operable to detect and output at least one bit from the differential output;

at least one transition detector (Fig. 7, blocks 72, 74, and 76, column 8, lines 15-31) coupled to the pre-amplifier and operable to detect and output at least one other bit from the differential output.

Regarding claim 36, which inherits the limitations of claim 35, Manohar et al. discloses the region detector further comprises a first region detector (Fig. 7, block 70', column 7, line 62-column 8, line 51) to process data corresponding to odd-numbered clock cycles and a second region detector (Fig. 7, block 70, column 7, line 62-column 8, line 51) to process data corresponding to even-numbered clock cycles; and

the transition detector comprises a first transition detector (Fig. 7, block 76, column 7, line 62-column 8, line 51) to process data corresponding to odd-numbered clock cycles and a second transition detector (Fig. 7, block 74, column 7, line 62-column 8, line 51) to process data corresponding to even-numbered clock cycles.

Regarding claim 37, which inherits the limitations of claim 35, Manohar et al. discloses the pre-amplifier is further operable to receive a predetermined voltage indicating characteristics of a transmission channel through the symbol stream was transmitted (column 5, lines 48-62 an column 6, lines 39-47), wherein the input voltages are the predetermined voltages.

Regarding claim 38, which inherits the limitations of claim 35, Manohar et al. discloses the pre-amplifier is further operable to receive a bias voltage which biases the pre-amplifier in a saturation region to ensure linear operation (column 6, lines 12-38).

Regarding claim 42, Manohor et al. a method of processing transmitted signals comprising:

receiving (Fig. 5, column 5, line 66-column 6, line 63) a symbol stream and generating a differential output, wherein the symbol stream comprises a plurality of symbols with each symbol uniquely defined by a signal transition and signal region in a carrier signal, each symbol representing a plurality of data (column 2, lines 36-62, also see Response to Arguments above);

determining (Fig. 7, block 70, column 7, line 62-column 8, line 51) at least one bit from the differential output by detecting whether a portion of the symbol stream is within a defining voltage region; and

determining (Fig. 7, blocks 72, 74, and 76, column 8, lines 15-31) at least one other bit from the differential output by detecting a voltage transition in a portion of the symbol stream.

Regarding claim 43, which inherits the limitations of claim 42, Manohar et al. discloses the detecting a voltage transition in a portion of the symbol stream further comprises determining whether the transition is positive or negative (column 8, lines 15-31).

Regarding claim 44, which inherits the limitations of claim 42, Manohar et al. discloses receiving a predetermined voltage indicating characteristics of a transmission channel through which the symbol stream as transmitted and referencing the voltage regions and the voltage transitions relative to the predetermined voltage (column 8, line 55-column 9, line18).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-9 and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manohar (I) et al. (previously cited in Office Action 3/11/04).

Regarding claim 1, Manohar et al. discloses an apparatus (Figs. 2, 4, and 6) for providing symbol signaling comprising:

a symbol encoder circuit (Figs. 2 and 4, column 2, line 41-column 3, and column 7, lines 19-49) operable to encode data into symbols, each symbol uniquely defined by a signal transition (column 7, lines 18-24) and a signal region (Table 1, voltage levels (low, mid, high)) in a carrier

signal, each symbol representing a plurality of data (Table 1, also see Response to Arguments); and

a driver circuit (Figs. 4 and 5, column 4, line 65-column 6, line 22) coupled to the symbol encoder circuit, the driver circuit operable to drive the carrier signal.

Manohar et al. does not disclose the apparatus provides multi-symbol signaling because the encoder is a multi-symbol encoder. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the encoder of Manohar et al. could have encoded a plurality of symbols in the same manner in which it encodes a single symbol. As shown in Table 1, a sequence of bits (which can represent a symbol) corresponds to a particular signal level (region) and transition. Sequence A contains four bits, which can be represented as two symbols containing two bits. Thus, it would have been obvious that the encoding procedure of Manohar et al. would have produced the same results if these four bits had been grouped together as two symbols. Thus, claim 1, does not constitute patentability.

Regarding claim 2, which inherits the limitations of claim 1, Manohar et al. discloses a signal region (voltage levels) is defined with reference to a predetermined voltage (column 6, line 60-column 7, line 14, high voltage level (5 volts), low voltage level (0 volts)).

Regarding claim 3, which inherits the limitations of claim 1, Manohar et al. discloses a signal transition is defined by a change is signal level (Fig.1, column 2, lines 8-37).

Regarding claim 4, which inherits the limitations of claim 1, Manohar et al. discloses a signal transition can be either a rise or fall in signal level (Fig. 1, column 2, lines 8-37).

Regarding claim 5, which inherits the limitations of claim 1, Manohar et al. does not disclose a push-pull driver circuit. However, Manohar et al. discloses using a differential driver

to drive the transmission signal (column 4, line 65-column 6, line 22). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a push-pull driver could have been implemented to perform the same function as the differential driver and drive the transmission signal. Thus, using a push-pull driver is deemed a design choice and does not constitute patentability.

Regarding claim 6, which inherits the limitations of claim 1, Manohar et al. discloses a differential output driver circuit operable to drive a differential carrier signal (Figs. 4 and 5, column 4, line 65-column 6, line 22).

Regarding claim 7, which inherits the limitations of claim 1, Manohar et al. discloses the driver circuit comprises:

a first supply source (Fig. 5, block 42, column 5, line 59-column 6, line 22);

a second supply source (Fig. 5, block 46, column 5, line 59-column 6, line 22);

a first transistor (Fig. 5, block 60, column 5, line 59-column 6, line 22) coupled to the first supply source at a first node;

a second transistor (Fig. 5, block 62, column 5, line 59-column 6, line 22) coupled to the second supply source at a second node and coupled to the first transistor at a third node.

Regarding claim 8, which inherits the limitations of claim 7, Manohar et al. discloses the first supply source and second supply source both comprise of constant current sources (column 5, line 59-column 6, line 22).

Regarding claim 9, which inherits the limitations of claim 7, Manohar et al. does not disclose the first and second supply sources comprises voltage sources. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that voltage

supply sources could have been implemented depending on the design specification of the circuit. The voltage supply source would supply voltages in the same manner the current supply sources supply current throughout the circuit. Thus, using voltage supply sources is deemed a design choice and does not constitute patentability.

Regarding claim 23, Manohar et al. discloses a method for providing symbol signaling comprising:

receiving (column 7, line 28-column 8, line 5) data (di) for output from an originating device;

encoding (Figs. 2 and 4, column 2, line 41-column 3, and column 7, lines 19-49) the data into symbols, each symbol uniquely defined by a signal transition (column 7, lines 18-24) and a signal region (Table 1, voltage levels (low, mid, high)) in a carrier signal, each symbol representing a plurality of data (Table 1, see also Response to Arguments); and

transmitting (Figs. 4 and 5, column 4, line 65-column 6, line 22) the carrier signal out of the originating device to a destination device.

Manohar et al. does not disclose the apparatus provides multi-symbol signaling because the encoder is a multi-symbol encoder. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the encoder of Manohar et al. could have encoded a plurality of symbols in the same manner in which it encodes a single symbol. As shown in Table 1, a sequence of bits (which can represent a symbol) corresponds to a particular signal level (region) and transition. Sequence A contains four bits, which can be represented as two symbols containing two bits. Thus, it would have been obvious that the encoding procedure

of Manohar et al. would have produced the same results if these four bits had been grouped together as two symbols. Thus, claim 23, does not constitute patentability.

Regarding claims 24-26, which inherit the limitations of claim 23, the claimed method discloses features corresponding to subject matter mentioned in the above rejection of claims 2-4 which is applicable hereto.

Regarding claim 27, which inherits the limitations of claim 23, Manohar et al. discloses generating a differential carrier signal; and transmitting the differential carrier signal out of the originating device to a destination device (Figs. 4 and 5, column 4, line 65-column 6, line 22).

6. Claims 12-17, 20, 28-34, 39 and 47-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manohar (II) et al. (previously cited in Office Action 3/11/04).

Regarding claim 12, Manohar et al. discloses an apparatus (Figs. 5 and 7) for recovering data from symbol signaling comprising:

a pre-amplifier (Fig. 5, column 5, line 66-column 6, line 63) operable to receive a carrier signal conveying symbols, each symbol uniquely defined by a signal transition and signal region (voltage level) in the carrier signal, each symbol representing a plurality of data (see Response to Arguments);

a region detector (Fig. 7, block 70, column 7, line 62-column 8, line 51) coupled to the pre-amplifier and operable to determine the defining signal region (voltage level (high or low states) for each symbol; and

a transition detector (Fig. 7, blocks 72, 74, and 76, column 8, lines 15-31) coupled to the pre-amplifier and operable to determine the defining signal transition for each symbol.

Manohar et al. does not disclose the apparatus recovers data from multi-symbol signaling. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the apparatus of Manohar et al. could have recovered data from a plurality of symbols in the same manner in which it recovers data from a single symbol. Therefore, recovering data from multiple symbols could have been implemented in the same manner as which Manohar et al. peforms the recovery on a single symbols, just that the apparatus would perform the same recovery operation on multiple symbols instead of a single symbol. Allowing the apparatus to recover data from multiple symbols would increase the capacity of data which could be transmitted. Thus, recovering data from a plurality of symbols is deemed a design choice and does not constitute patentability.

Regarding claim 13, which inherits the limitations of claim 12, Manohar et al. discloses a signal region (voltage levels) is defined with reference to a predetermined voltage (column 8, line 55-column 9, line 18).

Regarding claim 14, which inherits the limitations of claim 12, Manohar et al. discloses a signal transition is defined by a change is signal level (Fig. 2, column 2, lines 41-62 and column 8, lines 15-31).

Regarding claim 15, which inherits the limitations of claim 12, Manohar et al. discloses a signal transition can be either a rise or fall in signal level (Fig. 2, column 2, lines 41-62 and column 8, lines 15-31).

Regarding claim 16, which inherits the limitations of claim 12, Manohar et al. discloses the pre-amplifier is operable to generate a pair of differential signals for the carrier signal

(column 8, lines 4-6), wherein the amplifier in each biased comparator produces one differential signal.

Regarding claim 17, which inherits the limitations of claim 16, Manohar et al. does not disclose the transition detector is operable to sample each of the pair of differential signals at least twice for each symbol. However, Manohar et al. discloses the transition detector detects transitions based on the differential signals (column 8, lines 15-31). Therefore, it would have been obvious to one skilled in the art at the time the invention was made that sampling the differential signals could have been implemented to detect transitions. The sampling would perform the same function as the detection operation of Manohar et al. and detect transitions in the signal. Thus, implementing the sampling function to detect transistions is deemed a design choice and does not constitute patentability.

Regarding claim 20, which inherits the limitations of claim 16, Manohar et al. does not disclose the region detector is operable to take an average value for each of the pair of differential signals for each symbol. However, Manohar et al. discloses the region detector detects the region (voltage level) of the signal by comparing the voltage of the signal to a reference voltage (column 8, lines 7-39). Therefore it would have been obvious to one skilled in the art at the time the invention was made that taking average value to detect the region of the signal could have been implemented to detect the region. The averaging would perform the same function as the detection operation of Manohar et al. and detect the region of the signal. Thus, implementing the averaging function to detect the region is deemed a design choice and does not constitute patentability.

Regarding claims 28-31, the claimed method includes features corresponding to the subject matter mentioned in the above rejection of claims 12, 16, 17, and 20, which is applicable hereto.

Regarding claims 32, Manohar et al. discloses a system for providing symbol signaling comprising:

a symbol transmitter (column 2, lines 35-63, see also U.S. Patent No. 5, 917, 340 of the same inventor) operable to encode a first sequence of data into symbols, each symbol uniquely defined by a signal transition and signal region (voltage level), each symbol representing a plurality of data (see Response to Arguments above) the transmitter operable to output a first transmission signal conveying the symbol; and

a symbol receiver (Figs. 5 and 7, column 7, line 62-column 8, line 51) operable to receive a second transmission signal conveying a second symbol, the second symbol representing a second sequence of data, the receiver operable to recover the second sequence of data by detecting a signal transition and signal region for each symbol.

Manohar et al. does not disclose the apparatus provide multi-symbol signaling. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the encoder of Manohar et al. could have encoded a plurality of symbols in the same manner in which it encodes a single symbol to provide multi-symbol signaling. As shown in Table 1, a sequence of bits (which can represent a symbol) corresponds to a particular signal level (region) and transition. Sequence A contains four bits, which can be represented as two symbols containing two bits. Thus, it would have been obvious that the encoding/signaling procedure of

Manohar et al. would have produced the same results if these four bits had been grouped together as two symbols. Thus, claim 1, does not constitute patentability.

Regarding claims 33, which inherits the limitations of claim 32, Manohar et al. discloses the receiver comprises:

a region detector (Fig. 7, block 70, column 7, line 62-column 8, line 51) operable to determine the defining signal region (voltage level (high or low states) for each of a second symbol; and

a transition detector (Fig. 7, blocks 72, 74, and 76, column 8, lines 15-31) operable to determine the defining signal transition for each or a second symbol.

Regarding claim 34, which inherits the limitations of claim 32, Manohar et al. discloses the transmitter is further operable to generate a differential transmission signal for the first transmission signal (column 2, lines 49-54, RX+ and RX-).

Regarding claim 39, which inherits the limitations of claim 35 (see rejection of claim 39 above), Manohar et al. does not disclose the bias voltage is process, voltage, and temperature compensated. However, it would have been obvious to one skilled in the art at the time the invention was made that the bias voltage could have been compensated to insure an accurate bias voltage was being applied to the amplifier. Thus compensating a bias voltage does not constitute patentability.

Regarding claim 47, Manohar et al. discloses all the limitations of claim 47 (see previous rejection of claim 32), including the system is included in monolithic semiconductor devices for communication between the monolithic semiconductor devices (column 1, lines 14-17, see also

U.S. Patent No. 5, 917, 340 of the same inventor), wherein the transmitter and receiver are included on CMOS devices.

Regarding claim 48, which inherits the limitations of claim 47, Manohar et al. discloses one of the semiconductor device comprises a processing device (Fig. 7, block 70).

Regarding claim 49, which inherits the limitations of claim 47, Manohar et al. does not disclose one of the semiconductor devices comprises a memory device. However, it would have been obvious to one skilled in the art at the time the invention was made that a memory could have been included on the semiconductor devices to allow the devices to store values that may be essential to processing the signal. Thus, implementing a memory on a device does not constitute patentability.

Regarding claim 50, Manohar et al. discloses all the limitations of claim 47 (see previous rejection of claim 32), including the system is included in monolithic semiconductor devices for communication between the monolithic semiconductor devices, wherein the originating element is the transmitter and the destination element is the receiver (column 1, lines 14-17, see also U.S. Patent No. 5, 917, 340 of the same inventor), wherein the transmitter and receiver are included on CMOS devices.

7. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manohar (I) et al. (previously cited in Office Action 3/11/04) in view of Barrow (previously cited in Office Action 3/11/04).

Regarding claim 10, Manohar et al. discloses all the limitations of claim 10 (see previous rejection of claim 7), except a stabilization control circuit operable to generate control signals for stabilizing nodes.

Barrow discloses a control circuit (Fig. 2, blocks 233 and 235, column 3, lines 2-10 and column 7, lines 1-13) which generates control signals for controlling the potential at a node in a driver circuit. Controlling the potential (voltage/current) across a node in a circuit is essential to the performance of the circuit. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include the modify the device of Manohar et al. with the control circuit of Barrow to control the nodes in order to prevent a malfunction such as a "short circuit" in the device.

Regarding claim 11, which inherits the limitations of claim 10, Manohar et al. discloses a third transistor coupled to the first node (Fig. 5, element 56) and second transistor coupled to the second node (Fig. 5, element 58).

Allowable Subject Matter

8. Claims 18, 19, 21, 22, 40, 41, 45, and 46 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Curtis Odom
September 3, 2004

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600